Common Ions and Oxidation State

1-				2-		3-	
acetate	$C_2H_3O_2^-$	cyanide	CN^-	carbonate	CO_3^{2-}	arsenate	AsO_4^{3-}
amide	NH_2^-	cyanate	OCN^-	chromate	CrO_4^{2-}	arsenite	AsO_3^{3-}
hydrogen carbonate		fluoride	F^-	dichromate	$Cr_2O_7^{2-}$	citrate	$C_6H_5O_7^{3-}$
(bicarbonate)	HCO_3^-	hydride	H^-	oxide	O^{2-}	ferricyanide	$Fe(CN)_6^{3-}$
hydrogen sulfate		hydroxide	OH^-	oxalate	$C_2O_4^{2-}$	nitride	N^{3-}
(bisulfate)	HSO_4^-	hypochlorite	ClO^-	silicate	SiO_3^{2-}	phosphate	PO_4^{3-}
bisulfide	HS^-	iodate	IO_3^-	sulfate	SO_4^{2-}	phosphite	PO_3^{3-}
bisulfite	HSO_3^-	iodide	I^-	sulfide	S^{2-}	phosphide	P^{3-}
bromate	BrO_3^-	nitrate	NO_3^-	sulfite	SO_3^{2-}		
bromide	Br^-	nitrite	NO_2^-	tartrate	$C_4H_4O_6^{2-}$		
chlorate	ClO_3^-	perchlorate	ClO_4^-	tetraborate	$B_4O_7^{2-}$		
chlorite	ClO_2^-	permanganate	MnO_4^-	thiosulfate	$S_2O_3^{2-}$		
chloride	Cl^-	thiocyanate	SCN^-				

acetate	$C_2H_3O_2^-$
ammonium	NH_4^+
arsenate	AsO_4^{3-}
arsenite	AsO_3^{3-}
azide	N_3^-
benzoate	$C_7H_5O_2^-$
borate	BO_3^{3-}
bromate	BrO_3^-
carbonate	CO_3^{2-}
chlorate	ClO_3^-
chlorite	ClO_2^-
chromate	CrO_4^{2-}
cyanide	CN^-
dichromate	$Cr_2O_7^{2-}$
dihydrogen phosphate	$H_2PO_4^-$
dihydrogen phosphite	$H_2PO_3^-$
hydrogen carbonate	HCO_3^-
hydrogen phosphate	HPO_4^{2-}
hydrogen phosphite	HPO_3^{2-}
hydrogen sulfate	HSO_4^-
hydrogen sulfide	HS^-
hydrogen sulfite	HSO_3^-
hydroxide	OH^-
hypochlorite	ClO^-
iodate	IO_3^-
manganate	MnO_4^{2-}
nitrate	NO_3^-
nitrite	NO_2^-
oxalate	$C_2O_4^{2-}$
perchlorate	ClO_4^-
permanganate	MnO_4^-
peroxide	O_2^{2-}
phosphate	PO_4^{3-}
phosphite	PO_3^{3-}
silicate	SiO_3^{2-}
sulfate	SO_4^{2-}
sulfite	SO_3^{2-}
tartrate	$C_4H_4O_6^{2-}$
thiocyanate	SCN^-
thiosulfate	$S_2O_3^{2-}$

AsO_3^{3-}	arsenite
AsO_4^{3-}	arsenate
BO_3^{3-}	borate
BrO_3^-	bromate
$C_2H_3O_2^-$	acetate
$C_2O_4^{2-}$	oxalate
$C_4H_4O_6^{2-}$	tartrate
$C_7H_5O_2^-$	benzoate
ClO^-	hypochlorite
ClO_2^-	chlorite
ClO_3^-	chlorate
ClO_4^-	perchlorate
CN^-	cyanide
CO_3^{2-}	carbonate
$Cr_2O_7^{2-}$	dichromate
CrO_4^{2-}	chromate
$H_2PO_3^-$	dihydrogen phosphite
$H_2PO_4^-$	dihydrogen phosphate
HCO_3^-	hydrogen carbonate
HPO_3^{2-}	hydrogen phosphite
HPO_4^{2-}	hydrogen phosphate
HS^-	hydrogen sulfide
HSO_3^-	hydrogen sulfite
HSO_4^-	hydrogen sulfate
IO_3^-	iodate
MnO_4^-	permanganate
MnO_4^{2-}	manganate
N_3^-	azide
NH_4^+	ammonium
NO_2^-	nitrite
NO_3^-	nitrate
O_2^{2-}	peroxide
OH^-	hydroxide
PO_3^{3-}	phosphite
PO_4^{3-}	phosphate
$S_2O_3^{2-}$	thiosulfate
SCN^-	thiocyanate
SiO_3^{2-}	silicate
SO_3^{2-}	sulfite
SO_4^{2-}	sulfate

PERIODIC TABLE OF IONS

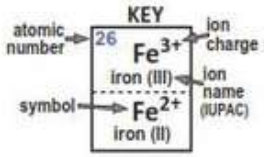


TABLE OF POLYATOMIC IONS

acetate	CH_3COO^-	dihydrogen phosphate	$H_2PO_4^-$	oxalate	$C_2O_4^{2-}$
arsenate	AsO_4^{3-}	hydrogen carbonate	HCO_3^-	perchlorate	ClO_4^-
arsenite	AsO_3^{3-}	hydrogen oxalate	$HC_2O_4^-$	periodate	IO_4^-
benzoate	$C_6H_5COO^-$	hydrogen sulfate	HSO_4^-	permanganate	MnO_4^-
borate	BO_3^{3-}	hydrogen sulfide	HS^-	peroxide	O_2^{2-}
bromate	BrO_3^-	hydrogen sulfite	HSO_3^-	phosphate	PO_4^{3-}
carbonate	CO_3^{2-}	hydroxide	OH^-	pyrophosphate	$P_2O_7^{4-}$
chlorate	ClO_3^-	hypochlorite	ClO^-	sulfate	SO_4^{2-}
chloride	Cl^-	iodate	IO_3^-	sulfite	SO_3^{2-}
chlorite	ClO_2^-	monohydrogen phosphate	HPO_4^{2-}	thiocyanate	SCN^-
chromate	CrO_4^{2-}	nitrate	NO_3^-	thiosulfate	$S_2O_3^{2-}$
cyanate	CNO^-	nitrite	NO_2^-	**POSITIVE POLYATOMIC IONS**	
cyanide	CN^-	orthosilicate	SiO_4^{4-}	ammonium	NH_4^+
dichromate	$Cr_2O_7^{2-}$			hydronium	H_3O^+

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H^+ hydrogen																1 H^- hydride	2 He helium
3 Li^+ lithium	4 Be^{2+} beryllium											5 B boron	6 C carbon	7 N^{3-} nitride	8 O^{2-} oxide	9 F^- fluoride	10 Ne neon
11 Na^+ sodium	12 Mg^{2+} magnesium											13 Al^{3+} aluminum	14 Si silicon	15 P^{3-} phosphide	16 S^{2-} sulfide	17 Cl^- chloride	18 Ar argon
19 K^+ potassium	20 Ca^{2+} calcium	21 Sc^{3+} scandium	22 Ti^{4+} titanium (IV) / Ti^{3+} titanium (III)	23 V^{3+} vanadium(III) / V^{5+} vanadium (V)	24 Cr^{3+} chromium (III) / Cr^{2+} chromium (II)	25 Mn^{2+} manganese(II) / Mn^{4+} manganese(IV)	26 Fe^{3+} iron (III) / Fe^{2+} iron (II)	27 Co^{2+} cobalt (II) / Co^{3+} cobalt (III)	28 Ni^{2+} nickel (II) / Ni^{3+} nickel (III)	29 Cu^{2+} copper (II) / Cu^+ copper (I)	30 Zn^{2+} zinc	31 Ga^{3+} gallium	32 Ge^{4+} germanium	33 As^{3-} arsenide	34 Se^{2-} selenide	35 Br^- bromide	36 Kr krypton
37 Rb^+ rubidium	38 Sr^{2+} strontium	39 Y^{3+} yttrium	40 Zr^{4+} zirconium	41 Nb^{5+} niobium (V) / Nb^{3+} niobium(III)	42 Mo^{6+} molybdenum	43 Tc^{7+} technetium	44 Ru^{3+} ruthenium(III) / Ru^{4+} ruthenium(IV)	45 Rh^{3+} rhodium	46 Pd^{2+} paladium(II) / Pd^{4+} paladium(IV)	47 Ag^+ silver	48 Cd^{2+} cadmium	49 In^{3+} indium	50 Sn^{4+} tin (IV) / Sn^{2+} tin (II)	51 Sb^{3+} antimony(III) / Sb^{5+} antimony(V)	52 Te^{2-} telluride	53 I^- iodide	54 Xe xenon
55 Cs^+ cesium	56 Ba^{2+} barium	57 La^{3+} lanthanum	72 Hf^{4+} hafnium	73 Ta^{5+} tantalum	74 W^{6+} tungsten	75 Re^{7+} rhenium	76 Os^{4+} osmium	77 Ir^{4+} iridium	78 Pt^{4+} platinum(IV) / Pt^{2+} platinum(II)	79 Au^{3+} gold (III) / Au^+ gold (I)	80 Hg^{2+} mercury (II) / Hg^+ mercury (I)	81 Tl^+ thallium (I) / Tl^{3+} thallium(III)	82 Pb^{2+} lead (II) / Pb^{4+} lead (IV)	83 Bi^{3+} bismuth(III) / Bi^{5+} bismuth(V)	84 Po^{2+} polonium(II) / Po^{4+} polonium(IV)	85 At^- astatide	86 Rn radon
87 Fr^+ francium	88 Ra^{2+} radium	89 Ac^{3+} actinium															

58 Ce^{3+} cerium	59 Pr^{3+} praseodymium	60 Nd^{3+} neodymium	61 Pm^{3+} promethium	62 Sm^{3+} samarium(III) / Sm^{2+} samarium(II)	63 Eu^{3+} europium (III) / Eu^{2+} europium (II)	64 Gd^{3+} gadolinium	65 Tb^{3+} terbium	66 Dy^{3+} dysprosium	67 Ho^{3+} holmium	68 Er^{3+} erbium	69 Tm^{3+} thulium	70 Yb^{3+} ytterbium(III) / Yb^{3+} ytterbium(II)	71 Lu^{3+} lutetium
90 Th^{4+} thorium	91 Pa^{5+} protactinium(V) / Pa^{4+} protactinium(IV)	92 U^{6+} uranium (VI) / U^{4+} uranium (IV)	93 Np^{5+} neptunium	94 Pu^{4+} plutonium(IV) / Pu^{6+} plutonium(VI)	95 Am^{3+} americium(III) / Am^{4+} americium(IV)	96 Cm^{3+} curium	97 Bk^{3+} berkelium(III) / Bk^{4+} berkelium(IV)	98 Cf^{3+} californium	99 Es^{3+} einsteinium	100 Fm^{3+} fermium	101 Md^{2+} mendelevium (II) / Md^{3+} mendelevium (III)	102 No^{2+} nobelium(II) / No^{3+} nobelium(III)	103 Lr^{3+} lawrencium

Given the Name of the Compound, Writing Formulas for Compounds

Determine if the Compound is **Binary Covalent** or **Ionic**:

Does the compound contain **only** *two types of non-metal elements*?

Yes

No

Binary Covalent Compound:

1) Write the symbol/formula of the first element in the compound's name, then the symbol/formula of the second ion in the compound's name.
2) Indicate how many of each element the molecule contains using subscripts after the atomic symbol.

- The numbers of atoms are given in the molecule's name in Greek prefixes
    - NOTE: If there is no Greek prefix in front of the first element in the name, that means the number is 1

Ionic Compound:

1) Write the symbol/formula of the first ion in the compound's name, then the symbol/formula of the second ion in the compound's name.
2) Indicate the ratio of each ion in the compound using subscripts after each ion.
    - The ratio of the ions are deduced by balancing the charges of the ions.
    - *IMPORTANT: When there is more than one of a polyatomic ion in the formula unit we use parenthesis. Example* $Mg(NO_3)_2$

Writing the Formulas of Ionic Compounds

Example: Write the formula for **calcium bromide.**

1) Write the symbol/formula of the first ion in the compound's name, then the symbol/formula of the second ion in the compound's name.

   Ca Br

2) Indicate the ratio of each ion in the compound using subscripts after each ion.
   - This step involves filling in the subscripts boxes as we did in the lecture:

     $Ca_{\square}Br_{\square}$
   - The ratio of the ions is deduced by **balancing the charges** of the ions.
     - This is done so that the **total charge** in the crystal, when large numbers of cations and anions combine, is **equal to zero**.
     - We find the ion's charge from its position on the periodic table **or** we look it up in a table in the case of polyatomic ions.
     - Transition metal with varying charges will be written in the compound name in Roman numerals.

   - First, temporarily write the charge of each ion above the ion's symbol.

     2+ 1-

     $Ca_{\square}Br_{\square}$

   - Next, place numbers in the subscripts such that the total charge of the compound is zero. Note that in this example, we need **two** bromide ions, each has a charge of (1-) to cancel the (2+) charge of the calcium ion:
     - 2(-1) + (+2) = 0 zero total charge.

     2+ 1-

     $Ca_{1}Br_{2} = CaBr_2$

   - We saw a shortcut way to do this called the Criss-Cross Method (see your chapter 3 notes)

     2+ 1-

     $Ca_{1}Br_{2} = CaBr_2$

   - Note, we do not leave the charges written above the symbols in the completed formula.

IMPORTANT: When there is more than one of a polyatomic ion in the formula, we use parenthesis.

- Not applicable in this example since there are no polyatomic ions in calcium bromide.

Examples: Writing the Formulas of Ionic Compounds

Write the formula for **iron(II) phosphate.**

1) Write the symbol/formula of the first ion in the compound's name, then the symbol/formula of the second ion in the compound's name.
    - When you see a polyatomic ion (nitrate), look up the formula and charge in the table of polyatomic ions.

$Fe\ PO_4$

2) Indicate the ratio of each ion in the compound using subscripts after each ion.
    b. This step involves filling in the subscripts boxes as we did in the lecture:

$Fe_{\square}\ PO_{4\square}$

- The ratio of the ions is deduced by **balancing the charges** of the ions.
    - This is done so that the **total charge** in the crystal, when large numbers of cations and anions combine, is **equal to zero**.
    - We find the ion's charge from its position on the periodic table **or** we look it up in a table in the case of polyatomic ions.
    - **Transition metal with varying charges will be written in the compound name in Roman numerals.**
        - In this example, now we know the charge on **the Fe ion is 2+**

- First, temporarily write the charge of each ion above the ion's symbol.

2+ 3-

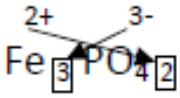
$Fe_{\square}\ PO_{4\square}$

- Next, place numbers in the subscripts such that the total charge of the compound is zero. Note that in this example, we need **two** phosphate ions, each has a charge of (3-) and three Fe^{2+} ions to balance the charge:
    - 2(-3) + 3(-2) = 0 zero total charge.

2+ 3-

$Fe_{3}\ PO_{4\,2}$

- We saw a shortcut way to do this called the Criss-Cross Method (see your chapter 3 notes)



*IMPORTANT: When there is more than one of a polyatomic ion in the formula unit we use parenthesis. There are **2 ions** of phosphate in iron(II)phosphate.*

$Fe_{3}\ PO_{4\,2} = Fe_3(PO_4)_2$

Examples: Writing the Formulas of Ionic Compounds

Write the formula for **barium sulfide.**

1) Write the symbol/formula of the first ion in the compound's name, then the symbol/formula of the second ion in the compound's name.

   Ba S

2) Indicate the ration of each ion in the compound using subscripts after each ion.
   - This step involves filling in the subscripts boxes as we did in the lecture:

     $Ba_{\square}S_{\square}$
   - The ratio of the ions is deduced by **balancing the charges** of the ions.
     - This is done so that the **total charge** in the crystal, when large numbers of cations and anions combine, is **equal to zero**.
     - We find the ion's charge from its position on the periodic table **or** we look it up in a table in the case of polyatomic ions.
     - Transition metal with varying charges will be written in the compound name in Roman numerals.

   - First, temporarily write the charge of each ion above the ion's symbol.

     2+ 2-

     $Ba_{\square}S_{\square}$

   - Next, place numbers in the subscripts such that the total charge of the compound is zero. Note that in this example, we need **one** sulfide ion, with a charge of (2-) to cancel the (2+) charge of the barium ion:
     - (-2) + (+2) = 0 zero total charge.

     2+ 2-

     $Ba_{\boxed{1}}S_{\boxed{1}} = BaS$

   - We saw a shortcut way to do this called the Criss-Cross Method (see your chapter 3 notes)

     2+ 2-

     $Ba_{\boxed{2}}S_{\boxed{2}} = BaS$

   - Note, the subscripts in ionic compound represent the ratio in which large numbers of anions and cations combine to form the ionic compounds. Since we want the **lowest ratio**: we use 1:1, since 2:2 = 1:1

     $\cancel{Ba_2S_2} = BaS$

Writing Ionic Compounds Practice #1

Write the formula for the following ionic compounds:

sodium bicarbonate _____

sodium fluoride _____

iron (III) chloride _____

sodium carbonate _____

copper (II) sulfate _____

magnesium hydroxide _____

barium nitrate _____

lithium sulfate _____

magnesium chloride _____

silver nitrate _____

aluminum sulfate _____

calcium hydroxide _____

calcium sulfate _____

mercury (II) nitrate _____

lead (IV) nitrate _____

magnesium iodide _____

sodium nitride _____

Writing the Formulas of Covalent Compounds

1) Write the symbol/formula of the first element in the compound's name, then the symbol/formula of the second ion in the compound's name.
2) Indicate how many of each element the molecule contains using subscripts after the atomic symbol.
    - The numbers of atoms are given in the molecule's name in Greek prefixes
    - NOTE: If there is no Greek prefix in front of the first element in the name, that means the number is 1.

Example: Write the formula of **dinitrogen tetrafluoride.**

1) Write the symbol/formula of the first element in the compound's name, then the symbol/formula of the second ion in the compound's name.

N F

2) Indicate how many of each element the molecule contains using subscripts after the atomic symbol.

$N_{\square}F_{\square}$

- The numbers of atoms are given in the molecule's name in Greek prefixes.
    - **di**nitrogen **tetra**fluoride
    - see your chapter 3 notes for a list of the Greek prefixes

N_2F_4

- **NOTE**: If there is no Greek prefix in front of the first element in the name, then the number is 1.
    - Example carbon tetrachloride = CCl_4

Example: Write the formula of **carbon disulfide.**

1) Write the symbol/formula of the first element in the compound's name, then the symbol/formula of the second ion in the compound's name.

C S

2) Indicate how many of each element the molecule contains using subscripts after the atomic symbol.

$C_{\square}S_{\square}$

- The numbers of atoms are given in the molecule's name in Greek prefixes.
    - carbon **di**sulfide
    - see your chapter 3 notes for a list of the Greek prefixes

$C_1S_2 \quad = CS_2$

- **NOTE**: If there is no Greek prefix in front of the first element in the name, then the number is 1.

Writing Covalent Compounds Practice #1

a. disulfur tetrafluoride _____

b. carbon trioxide _____

c. nitrogen pentoxide _____

d. nitrogen tribromide _____

e. dinitrogen heptachloride _____

f. carbon tetrachloride_____

g. hydrogen monochloride_____

h. trihydrogen monophosphide _____

i. dihydrogen monoxide _____

Given the Formulas for Compounds, Write the Name

Determine if the Compound is **Binary Covalent** or **Ionic**:

Does the compound contain **only** *two types of non-metal elements*?

Yes

No

Binary Covalent Compound:

1) List the name of the first element in the formula.
2) List the second element and add the –ide suffix.
3) Use Greek prefixes to indicate the number of each atom in the formula.

- Exception: **Do not use** mono- for the first element in the name.
- The *o* or *a* at the end of the Greek pre-fix is dropped when the element name begins with a vowel.

Ionic Compound:

1) Write the cation name first, then name the anion.
   - monoatomic anions use the "ide" suffix
2) If the cation is one of the transition metals with various charges, write the charge using parenthesis and Roman numerals after the metal name.

Writing the Names of Ionic Compounds

Example: Write the name for **$CaBr_2$**

1) Write the cation name first, then name the anion.
   - monoatomic anions use the "ide" suffix

calcium bromide

2) If the cation is one of the transition metals with various charges, write the charge using parenthesis and Roman numerals after the metal name.
   - Not necessary here, there is not a transition metal present

Example: Write the name for **$Mg(NO_3)_2$**

1) Write the cation name first, then name the anion.
   - monoatomic anions use the "ide" suffix
     - Here we notice that the anion is a **polyatomic ion**. Get the name from the polyatomic ion table (in your notes or textbook). *You will be given a copy of the polyatomic ion table on your exams.*
     - **Do not** change the suffix to "ide" with polyatomic ions:

magnesium nitrate

2) If the cation is one of the transition metals with various charges, write the charge using parenthesis and Roman numerals after the metal name.
   - Not necessary here, there is not a transition metal present

Writing the Names of Ionic Compounds

Example: Write the name for **CuF_2**

1) Write the cation name first, then name the anion.
   - monoatomic anions use the "ide" suffix

copper fluoride

2) If the cation is one of the ***transition metals*** with various charges, write the **charge using parenthesis and Roman numerals** after the metal name.

copper(?) fluoride

- We must figure out what the charge is on the copper, we can deduce the charge on the transition metal cations from the charge on the anions
  - Recall that the total charge for any compound must equal zero.
  - Since there are two fluorides, each with a charge of (1-) and there is only one copper, we can conclude that the charge on the copper must be (2+).
    - You can think of this as the reverse criss-cross! See chapter 3 notes for more details.

copper(II) fluoride

write the **charge in parenthesis in Roman numerals after the cation name**

Writing Ionic Compounds (With Transition Metals) Practice #2

$NaCl$ _____

$Fe_2(CO_3)_3$ _____

$Cu(OH)_2$ _____

$(NH_4)_2SO_4$ _____

$LiNO_3$ _____

$BaSO_4$ _____

$Mg(NO_3)_2$ _____

$AgCl$ _____

$Al(OH)_3$ _____

$CaSO_4$ _____

FeS _____

$PbCl_2$ _____

NaI _____

$MgCO_3$ _____

Writing the Names of Covalent Compounds

1) List the name of the first element in the formula.

2) List the second element and add the –ide suffix.

3) Use Greek prefixes to indicate the number of each atom in the formula.
   - Exception: do not use mono- for the first element in the name.
   - The *o* or *a* at the end of the Greek pre-fix is usually dropped when the element name begins with a vowel

Example: Write the name for **N_2S_4**

1) List the name of the first element in the formula.

   nitrogen

2) List the second element and add the –ide suffix.

   nitrogen sulfide

3) Use Greek prefixes to indicate the number of each atom in the formula.
   - See your textbook or lecture notes for a table of the Greek prefixes.

   ____nitrogen _____sulfide

   dinitrogen tetrasulfide
   - Exception: do not use mono- for the first element in the name.
     - Not applicable in this example
   - The *o* or *a* at the end of the Greek pre-fix is usually dropped when the element name begins with a vowel
     - Not applicable in this example

Example: Write the name for **SO_3**

1) List the name of the first element in the formula.

   sulfur

2) List the second element and add the –ide suffix.

   sulfur oxide

3) Use Greek prefixes to indicate the number of each atom in the formula.

   ____ sulfur _____ oxide

   sulfur trioxide
   - Exception: do not use **mono-** for the ***first*** element in the name.
     - NOTE, we did not write **mono**sulfur because of this rule!
   - The *o* or *a* at the end of the Greek pre-fix is usually dropped when the element name begins with a vowel
     - Not applicable in this example

Example: Write the name for **SO_3**

1) List the name of the first element in the formula.

sulfur

2) List the second element and add the –ide suffix.

sulfur oxide

3) Use Greek prefixes to indicate the number of each atom in the formula.

____ sulfur _____ oxide

sulfur trioxide

- Exception: do not use **mono-** for the ***first*** element in the name.
  - NOTE, we did not write **mono**sulfur because of this rule!
- The *o* or *a* at the end of the Greek pre-fix is usually dropped when the element name begins with a vowel
  - Not applicable in this example

Example: Write the name for **CO**

1) List the name of the first element in the formula.

carbon

2) List the second element and add the –ide suffix.

carbon oxide

3) Use Greek prefixes to indicate the number of each atom in the formula.

____ carbon _____ oxide

carbon monoxide

- Exception: do not use **mono-** for the ***first*** element in the name.
  - NOTE, we did not write **monocarbon** because of this rule!
- The *o* or *a* at the end of the Greek pre-fix is usually dropped when the element name begins with a vowel
  - NOTE, we did not write **monooxygen** because of this rule!

Writing Covalent Compounds Practice #2

a. Br_2I_4 _____

b. P_5F_8 _____

c. NO_5 _____

- Remember: The *o* or *a* at the end of the Greek pre-fix is usually dropped when the element name begins with a vowel

d. NBr_3 _____

e. N_2O_5 _____

f. $BrCl_3$ _____

g. H_2S _____

h. N_2O _____

Ionic Compounds Summary

Name the following compounds:

1. CaF_2 _____
2. Na_2O _____
3. BaS _____
4. $CuSO_4$ _____
5. Fe_2O_3 _____
6. $HgCl_2$ _____
7. $AgNO_3$ _____
8. $MgCO_3$ _____
9. $KC_2H_3O_2$ _____
10. $K_2Cr_2O_7$ _____
11. $Al(OH)_3$ _____
12. $PbBr_2$ _____
13. $ZnSO_3$ _____
14. $NaHCO_3$ _____
15. NH_4Cl _____
16. Li_3PO_4 _____
17. $SnCl_2$ _____
18. $Al(NO_2)_3$ _____
19. Rb_2CrO_4 _____
20. $KMnO_4$ _____
21. $CuCl$ _____
22. $FeSO_4$ _____

Give the formula for each compound:

23. sodium fluoride _____
24. potassium sulfide _____
25. calcium carbonate _____
26. magnesium hydroxide _____
27. zinc nitrate _____
28. silver acetate _____
29. copper (II) oxide _____
30. iron (III) chloride _____
31. barium chromate _____
32. aluminum oxide _____
33. lead (II) sulfate _____
34. tin (IV) oxalate _____
35. calcium phosphate _____
36. lithium permanganate _____
37. mercury (I) nitrate _____
38. radium sulfite _____
39. chromium (III) chloride _____
40. ammonium sulfide _____
41. copper (II) acetate _____
42. calcium bicarbonate _____
43. tin (II) oxide _____
44. silver sulfite _____

Binary Covalent Compounds

Please complete the following table:

Name of *Covalent* Compound	Formula of *Covalent* Compound
1. carbon dioxide	
2. phosphorus triiodide	
3. sulfur dichloride	
4. nitrogen trifluoride	
5. dioxygen difluoride	
	6. N_2F_4
	7. SCl_4
	8. ClF_3
	9. SiO_2
	10. P_4O_{10}

Determine whether the following compounds are **covalent** or **ionic** and give them their proper names.

1. $Ba(NO_3)_2$
2. CO
3. PCl_3
4. KI
5. CF_4
6. MgO
7. Cu_2S
8. SO_2
9. NCl_3
10. XeF_6

Answers

Practice Problems KEY

Writing Ionic Compounds Practice #1 Key

sodium bicarbonate $NaHCO_3$

sodium fluoride NaF

iron (III) chloride $FeCl_3$

sodium carbonate Na_2CO_3

copper (II) sulfate $CuSO_4$

magnesium hydroxide $Mg(OH)_2$

barium nitrate $Ba(NO_3)_2$

lithium sulfate Li_2SO_4

magnesium chloride $MgCl_2$

silver nitrate $AgNO_3$

aluminum sulfate $Al_2(SO_4)_3$

calcium hydroxide $Ca(OH)_2$

calcium sulfate $CaSO_4$

mercury (II) nitrate $Hg(NO_3)_2$

lead (IV) nitrate $Pb(NO_3)_4$

magnesium iodide MgI_2

sodium nitride Na_3N

KEY

Writing Covalent Compounds Practice #1 Key

a. disulfur tetrafluoride S_2F_4

b. carbon trioxide CO_3

c. nitrogen pentoxide NO_5

d. nitrogen tribromide NBr_3

e. dinitrogen heptachloride N_2Cl_7

f. carbon tetrachloride CCl_4

g. hydrogen monochloride HCl

h. trihydrogen monophosphide H_3P

i. dihydrogen monoxide H_2O

KEY Writing Ionic Compounds (With Transition Metals) Practice #2

NaCl sodium chloride

$Fe_2(CO_3)_3$ iron(III) carbonate

$Cu(OH)_2$ copper(II) hydroxide

$(NH_4)_2SO_4$ ammonium sulfate

$LiNO_3$ lithium nitrate

$BaSO_4$ barium sulfate

$Mg(NO_3)_2$ magnesium nitrate

AgCl silver chloride

- (note: silver is one of the transition metals that o

$Al(OH)_3$ aluminum hydroxide

$CaSO_4$ calcium sulfate

FeS Iron(II) sulfide

$PbCl_2$ lead(II) chloride

NaI sodium iodide

$MgCO_3$ magnesium carbonate

Writing Covalent Compounds Practice #2

KEY

a. Br_2I_4 dibromine tetriodide

b. P_5F_8 pentaphosphorus octafluoride

c. NO_5 nitrogen pentoxide
   - The *o* or *a* at the end of the Greek pre-fix is usually dropped when the element name begins with a vowel
     - NOTE, we did not write **pentaoxygen** because of this rule!

d. NBr_3 nitrogen tribromide

e. N_2O_5 dinitrogen pentoxide

f. $BrCl_3$ bromine trichloride

g. H_2S dihydrogen monosulfide

h. N_2O dinitrogen monoxide